

REMARKS

Applicant respectfully requests reconsideration of this application as amended. Claims 2, 5, 6, 8, 13, 16-18, 26, 29, 31, and 32 are canceled. Claims 1, 3, 4, 7, 9-12, 14, 15, 19 – 25, 27, 28, 30, and 33-49 are currently pending in this application.

Claim Rejections - 35 U.S.C. §102(b)

Claims 1, 3, 7, 9-12, 14, 19-25, 27, and 30 have been rejected under 35 U.S.C. §102(b) as being anticipated by Reisman et al. (U.S. Patent No. 4,891,329).

Response to 35 U.S.C. §102(e) rejections

With regard to the rejection of claims 1, 3, 7, 9-12, 14, 19-25, 27, and 30 under 35 U.S.C. §102(b) as being anticipated by Reisman, applicant has amended claims 1, 12, and 22 to overcome the examiner's rejection.

Specifically, applicant has added a limitation in these claims with the bonding process being bonding between the dielectric film and the semiconductor surface of the second semiconductor substrate.

Applicant submits that the present invention cannot be anticipated by Reisman because Reisman does not disclose a process of the present invention, namely bonding the insulator layer of the first substrate directly to a semiconductor surface of the second semiconductor substrate.

Applicant submits that Reisman specifies that the bonding of the two substrates occurs at an insulator-insulator interface, with various exemplary insulator-insulator interface bonding techniques. Applicant submits that the bonding process is different with different interfaces, as evidenced by the discussions of the two references cited by Reisman, disclosing a specific bonding process for two insulator surfaces. Thus applicant submits that the bonding between an insulator surface and a semiconductor surface is distinct from bonding between two insulator surfaces, and that one bonding process cannot be anticipated from the other.

With regard to the dependent claim 3, 14, and 27, applicant submits that Reisman only discloses a etch process, such as wet chemistry, plasma or reactive ion etching (Col. 4, lines 66-68). Applicant submits that Reisman is silent with respect to a grind back process or an ion exfoliation process. Thus applicant submits that these claims are not anticipated by Reisman.

With regard to the dependent claim 7 and 30, applicant submits that Reisman only discloses a etch process, such as wet chemistry, plasma or reactive ion etching (Col. 4, lines 66-68). Applicant submits that Reisman is silent with respect to a cleaving off process to remove the first substrate after bonding. Thus applicant submits that these claims are not anticipated by Reisman.

With respect to the dependent claims, applicant submits that these claims are dependent claims, thus should be allowable, at least for the reason stated above with respect to the independent claims 1, 12 and 22.

Claim Rejections - 35 U.S.C. §103(a)

Claims 4, 15, 28, 33, 39 and 44 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Reisman in view of admitted prior art.

Response to 35 U.S.C. §103(a) rejections

With respect to the rejection of claims 4, 15, 28, 33, 39 and 44 under 35 U.S.C. §103(a) as being unpatentable over Reisman in view of admitted prior art, applicant has amended the independent claims 33, 39 and 44 to overcome the examiner's rejection.

Specifically, applicant has added the limitation that the first dielectric film is sufficiently thick to cover the surface roughness of the epitaxial germanium layer.

Applicant submits that the present invention discloses a process of polishing the surface of the first dielectric film to achieve a smooth surface dielectric layer with practically any desired thickness, eliminating the effect of the surface roughness of the underlying germanium layer. Prior art conventional thin dielectric layer coating on a rough underlying layer would not possess a surface smoothness but exhibit similar surface roughness of the underlayer. Applicant thus submits that this process of

depositing a thick enough film together with a subsequent polishing step to achieve the desired thickness is not rendered obvious following Reisman in view of admitted prior art.

Applicant submits that Reisman fails to teach that the deposited dielectric film is sufficient thick to cover the surface roughness of the underlying germanium layer, in addition to the failure to teach polishing this dielectric film. Applicant submits that CMP is a conventional method of polishing, however, the combination of Reisman and admitted prior art does not rendered obvious to a person skilled in the art to forming a first dielectric film on top of the germanium layer with sufficient thickness to cover the germanium's surface roughness, together with polishing the surface of the first dielectric layer to achieve the desired dielectric thickness.

Furthermore, the thick dielectric formation and the polishing process are motivated by applicant's observation of the roughness of the deposited germanium layer. Since smoothing the germanium surface is time consuming (Paragraph [0006], last sentence), the present invention discloses the novel process of depositing a thick dielectric film (to cover the surface roughness) and then smoothing the dielectric layer (to achieve the desired dielectric thickness) before the bonding process. The present invention provides a novel process of forming a dielectric film with virtually any desired thickness without being affected by the roughness of the germanium underlayer. Thus applicant submits that the present invention as reflected in claims 33, 39 and 44 is novel and cannot be rendered obvious from Reisman in view of admitted prior art.

With respect to the dependent claims, applicant submits that these claims are dependent claims, thus should be allowable, at least for the reason stated above with respect to the independent claims 33, 39 and 44.

In conclusion, applicants respectfully submit that in view of the amendments and arguments set forth herein, the applicable rejections have been overcome.

Pursuant to 37 C.F.R. § 1.136(a)(3), applicant(s) hereby request and authorize the U.S. Patent and Trademark Office to (1) treat any concurrent or future reply that requires a petition for extension of time as incorporating a petition for extension of time for the appropriate length of time and (2) charge all required fees, including extension of time fees and fees under 37 C.F.R. §§ 1.16 and 1.17, to Deposit Account No. 02-2666.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

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Tue Nguyen

Reg. No. 53,390

12400 Wilshire Boulevard
Seventh Floor
Los Angeles, CA 90025-1026
(408) 720-8300